

THE environment

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Open Space and Recreation

A large portion of the urban development in the region is concentrated along the coastal plains of Los

Angeles, Orange, and Ventura counties and in the adjoining Valleys that extend inland from the coastal areas. The Pacific

Ocean borders the southern edge of Los Angeles, Orange, and Ventura counties, with numerous local and state beaches along the coast. Ventura County includes Los Padres National Forest along most of the northern portion of the county. Open space and recreational areas in Los Angeles County include the Mojave Desert and the Angeles National Forest and Los Padres National Forest. Orange County is home to the Cleveland National Forest and the Santa Ana Mountains, while Riverside County includes the San Jacinto Mountains, the Joshua Tree National Park in the Sonoran Desert, and the Mojave (high) Desert region. Most of San Bernardino County is open space, including the Mojave Desert and the mountainous San Bernardino National Forest. Much of the desert area is designated National Park Service land, including Death Valley National Monument, Joshua Tree National Monument, and the Mojave National Preserve. Imperial County includes the Salton Sea and a U.S. Fish and Wildlife Service National Wildlife Refuge. (See Map 5 page 68 for open space and recreation lands in the region.)

Air Quality

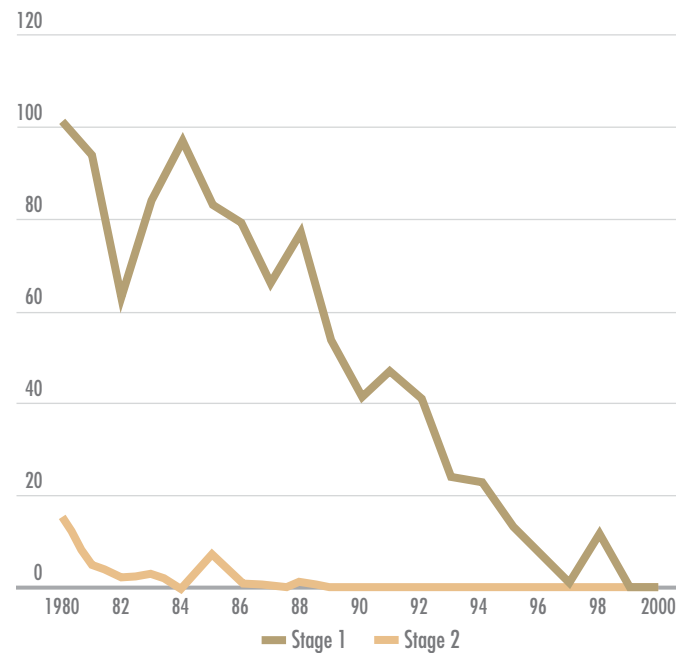
>> Good air quality is vital for the health of residents, nature, and the economy. >>

The Southern California Association of Governments, as the metropolitan planning organization for Southern California, is mandated to comply with Federal and State transportation and air quality regulations in its regional plans. There are six "criteria pollutants" identified by the federal Clean Air Act: carbon monoxide, ozone, nitrogen dioxide, particulate matter, sulphur dioxide and lead. Of these, the first four are important to transportation planning, as mobile sources are significant contributors.



Carbon monoxide (CO) is a product of automobile exhaust. CO reduces the flow of oxygen in the bloodstream and is particularly dangerous to persons with heart disease. Ozone is formed by the reaction between volatile organic compounds (VOC) and oxides of nitrogen (NO_x) in the presence of sunlight. Ozone negatively impacts the respiratory system. Nitrogen Dioxide (NO₂) is created under the high pressure and temperature conditions in internal combustion engines. It impacts the respiratory system and degrades visibility due to its brownish color. Particulate matter less than 10 microns in aerodynamic diameter (PM₁₀) are tiny particles of dust and soot that cause irritation and damage to the respiratory system. A recent study by a team of researchers at John Hopkins University concluded that the higher the PM₁₀ levels in cities throughout the nation, the higher the health risk.

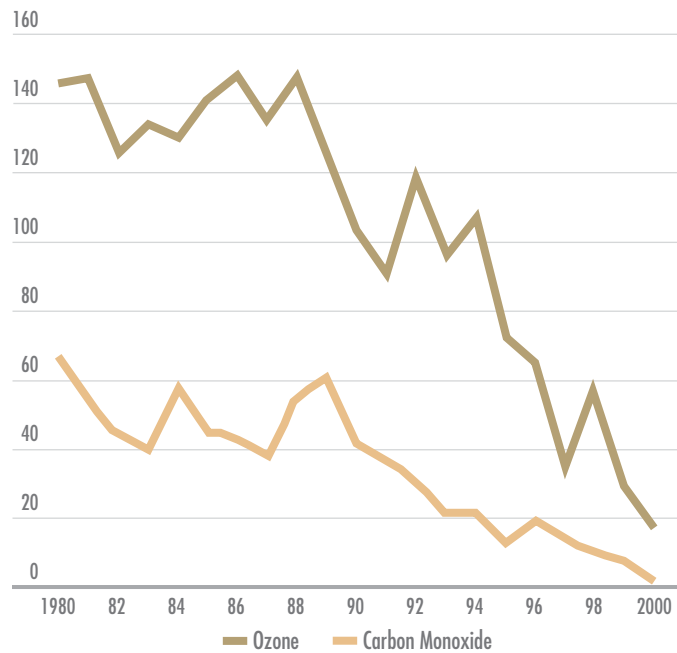
Figure 12
Number of Days of First/Second Stage Episodes



Source: South Coast Air Quality Management District

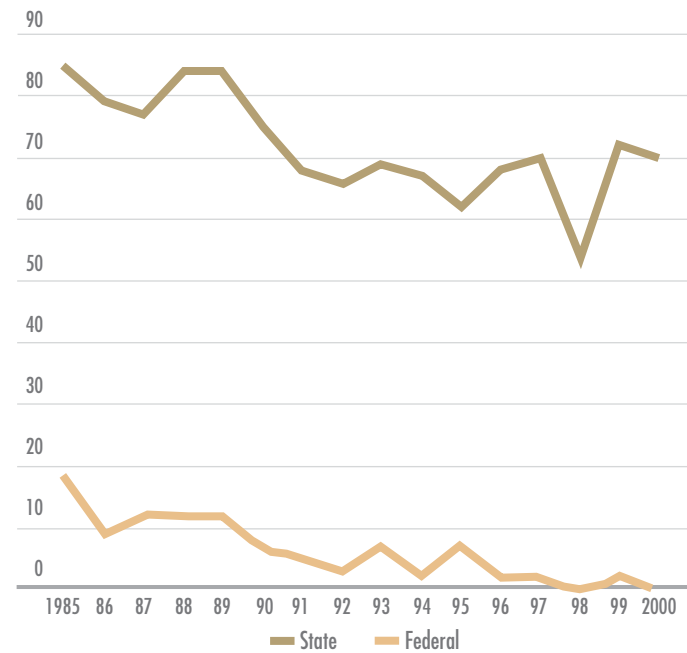
Note: Days the maximum 1-hour average ozone > .2 ppm / > .35 ppm (ppm = parts per million)

Figure 13
Number of Days Exceeding Federal Standards



Source: South Coast Air Quality Management District

Figure 14
Percent of Days Exceeding State and Federal Standards (PM₁₀)

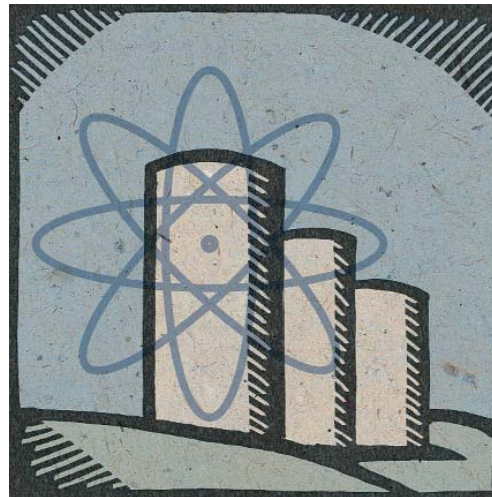


Source: South Coast Air Quality Management District

Note: Data are for the South Coast Air Basin, which includes the counties of Los Angeles and Orange, and parts of San Bernardino and Riverside. The data are for individual receptor areas.

For the second consecutive year, the region did not experience any full-scale smog alert conditions in 2000. The region exceeded the federal one-hour standards for Ozone (.12 parts per million parts of air, by volume per hour) during 17 days in 2000 at any one receptor area. However, the stricter (but not binding) eight-hour federal standard was exceeded during 73 days last year (.08 parts per million parts of air, by volume, over an eight-hour period). The federal standard for Carbon Monoxide was exceeded on two days in 2000. The state standard for Suspended Particulates PM10 was exceeded on 70 percent of the days sampled. Due to weather conditions and geography, the worst air quality in the region is in the Inland Empire counties of Riverside and San Bernardino, although these areas are not the major emitters of most pollutants.

(There are 37 receptor areas monitoring air quality throughout the South Coast Air Basin. See Map 6 page 69 for the location of the Air Quality Monitoring Stations.)




The new Administration in Washington, DC has joined power producers and business groups in the region in charging that clean air regulations are worsening California's energy crisis. Business groups have been lobbying for an easing of California's environmental laws, particularly as the energy crisis in California intensifies.

New rules being proposed would allow power-generating companies to continue a higher level of emissions on a short-term basis. In return, plant operators would have to install pollution control equipment they have resisted for years because they asserted it was too costly.

In 2000, power companies increased production from dirty, old boilers and turbines to try to make up for the state's power shortage. Of the 93 units generating power in Los

Angeles, Orange, Riverside, and San Bernardino counties, 40 units lack pollution control equipment. The result was more smog producing pollution released into the air in the summer of 2000 compared to 1999, approximately a three percent increase in the region's total emissions.

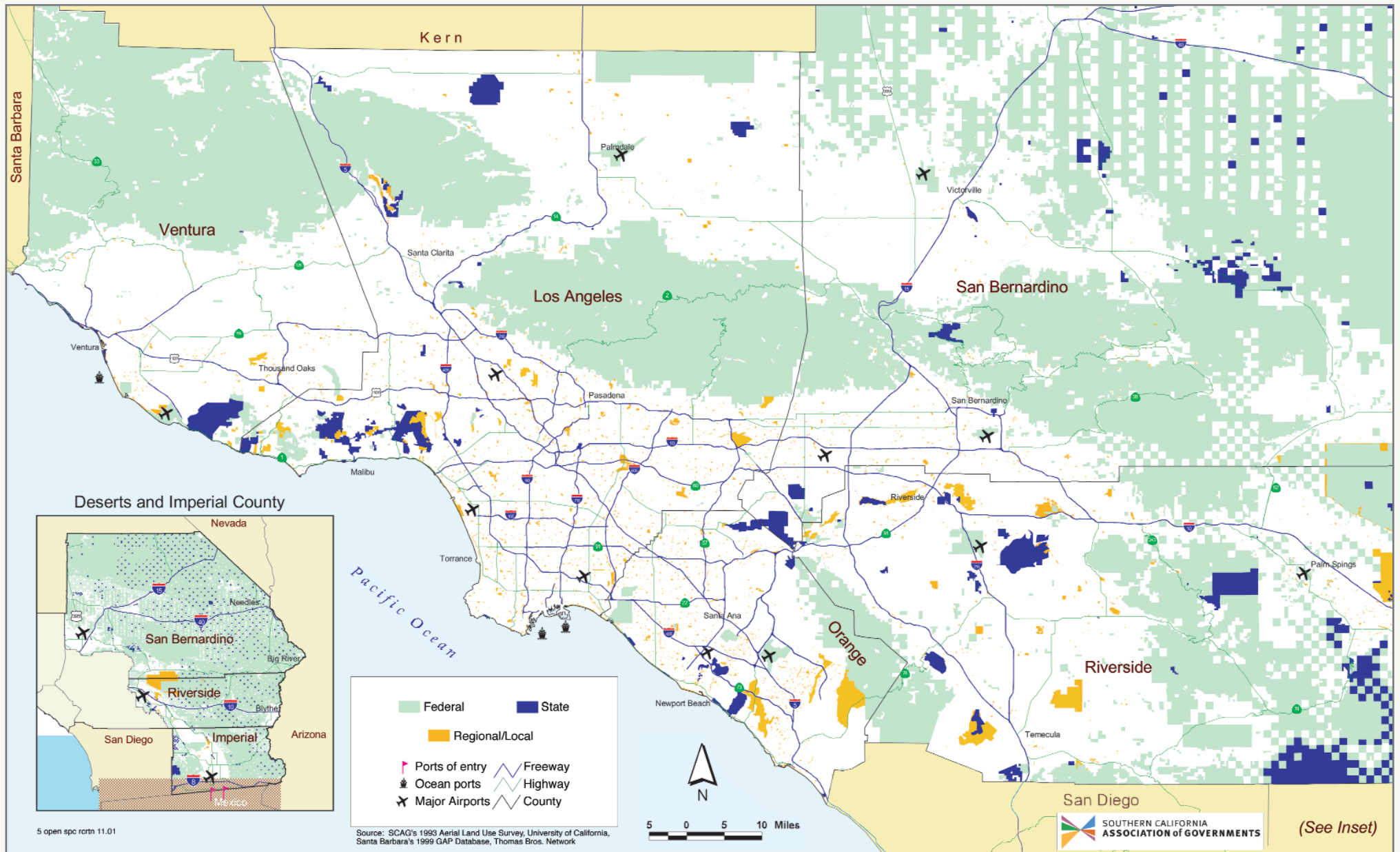


Transportation activities, particularly motor vehicles, are currently a major cause of air pollution. About 70 percent of the region's total emissions come from cars and trucks.

For the first time, air pollution from the increasing number of commercial ships is to be targeted for control. The Environmental Protection Agency is developing rules to cut smog-forming exhaust from the largest, diesel-powered ships, including cargo vessels, tankers, and cruise liners. In Southern California, large ships using the ports in Long Beach and San Pedro and those passing by the coast emit twice as much smog-forming nitrogen dioxide gas daily than all the commercial aircraft operating in the Los Angeles region. More than 5,000 vessels travel through the ports of Long Beach and Los Angeles. In an effort to reduce pollutants emitted into the air from smoke stacks of commercial vessels, a voluntary ship speed limit of 12 knots went into effect in early 2001 for most vessels traveling within 20 miles of the two ports.

"Greenhouse gas" emissions, a major contributor to global warming, jumped nearly three percent in the nation last year. This was the biggest US increase in years, while carbon dioxide emissions are declining in most other industrialized nations. Global warming is caused by increasing concentrations of carbon dioxide and other greenhouse gases in the Earth's atmosphere which trap solar heat, causing surface temperatures to rise over time. Yet, President Bush announced that the US will not participate in the Kyoto global warming accord, and that this administration will not pursue regulating carbon dioxide emissions from US power plants.

OPEN SPACE AND RECREATION LANDS



AIR QUALITY MONITORING STATIONS



Map 6

Solid Waste

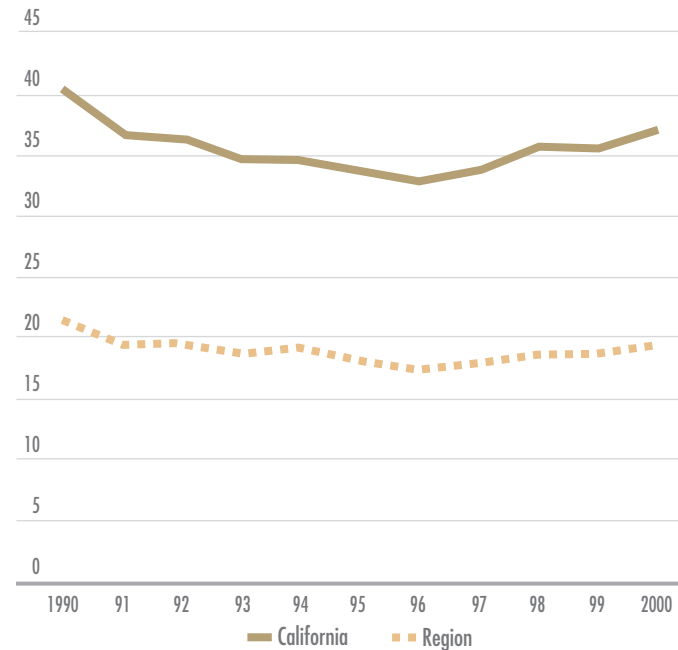
<< *The amount of solid waste deposited at landfills is important as a simple, measurable indicator of waste generated. A sustainable society recycles or reuses the waste generated as much as possible, minimizing the amount of waste sent to landfills.* >>

Residents, businesses, and institutions produced more than 221 million tons of municipal solid waste in the US in 2000, according to the American Society of Civil Engineers, a national organization which issues an annual report card on America's infrastructure. The 4.5 pounds of waste per person per day waste produced in the nation last year was higher than the average 4.3 pounds generated per person per day in 1990. In spite of that increase, there was a reduction of 13 percent in the waste sent to landfills between 1990 and 2000. And the amount of waste recycled in the US during this period nearly doubled.

Almost three-fourths of the nation's municipal landfills have closed since the mid-1980s as regulations governing land disposal have tightened. While waste-to-energy plants replaced many land-disposal facilities, increased costs and environmental concerns have stalled the growth of waste-to-energy plants. Recycling and composting have been the fastest growing methods of waste management.

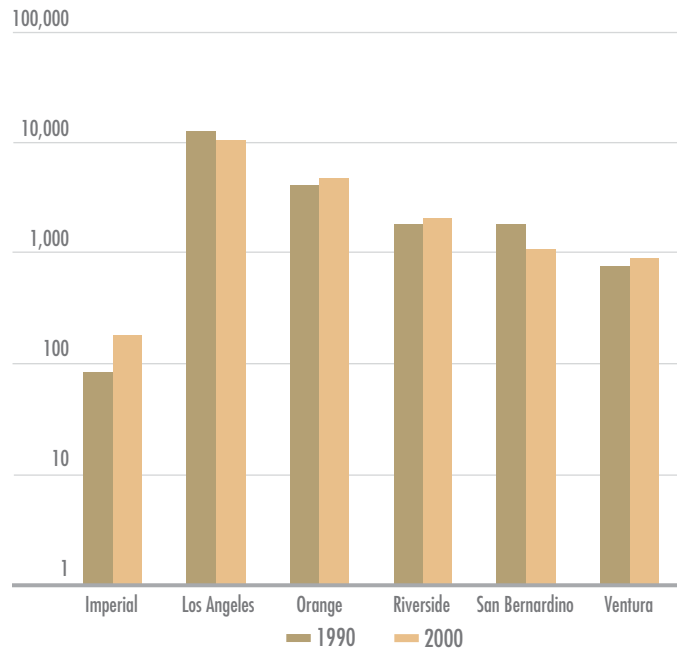
Figure 15

Solid Waste Disposal at Landfills (Million Tons)



Source: California Integrated Waste Management Board

Figure 16
Solid Waste Disposal at Landfills
Tonnage Log Scale (000)



Source: California Integrated Waste Management Board

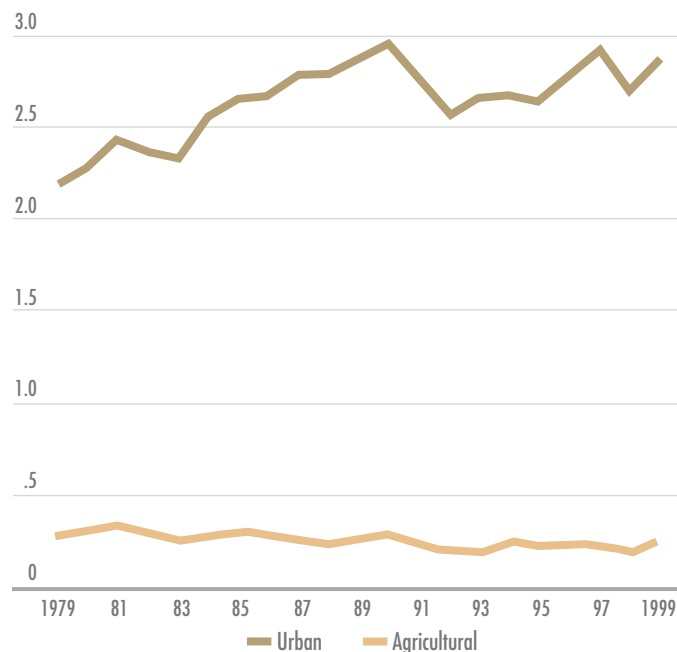
In 1989, the California Integrated Waste Management Board (CIWMB) required local governments to reduce the amount of trash going to landfills by 50 percent by the year 2000. California's diversion rate, or waste kept out of landfills, has increased steadily from 10 percent in 1989 to 42 percent in 2000, despite the state's booming economy and rising population. According to CIWMB, 28 million tons of waste were kept out of state landfills in 2000 by local diversion programs. The waste reduction successes throughout the state are attributed to local programs such as curbside pickups, drop-off centers, green waste collection, and municipal composting. The amount of trash sent to landfills in the region declined by over 2000 pounds between 1990 and 2000.

Water Quality and Resources

>> *Maintaining water quality and ensuring reliable water resources are important goals in Southern California.* <<

Figure 17

Water Use in Metropolitan Water District's Service Area
Retail Demands in Million Acre-Feet per Year (acre foot: 326,000 gallons)



Source: Metropolitan Water District of Southern California

The Metropolitan Water District (MWD) serves nearly 90 percent of the population in Southern California, including San Diego County. The service area includes portions of all counties in the SCAG region, except Imperial County. Water used in the MWD service area comes from both local and imported sources. Local sources include groundwater, surface water, and recycled wastewater. Sources of imported water include the Colorado River, the Owens Valley/Mono Basin, and the facilities of the State Water Project, which is owned and operated by the State of California Department of Water Resources. Urban use in the MWD area accounts for 92 percent of the retail demand, and agricultural use accounts for the remainder eight percent in 1999. (See Map 7 page 74 for the MWD Service Area.)


Table 9

Water Demand in Metropolitan Water District Service Area in Acre Feet, 1999 (000)

| County | Agricultural | Urban | Total Use |
|----------------|--------------|---------|-----------|
| Los Angeles | 4.0 | 1,648.5 | 1,652.5 |
| Orange | 20.4 | 626.8 | 647.2 |
| Riverside | 182.3 | 280.4 | 462.7 |
| San Bernardino | 32.4 | 185.5 | 217.9 |
| Ventura | 14.5 | 112.8 | 127.3 |
| Total | 253.6 | 2,854.0 | 3,107.6 |

Source: Metropolitan Water District (The Metropolitan Water District does not serve Imperial County.)

Note: One acre foot equals 326,000 gallons.



The California State Water Resources Control Board (SWRCB) has compiled a list of impaired water bodies in the State of California. The list includes several hundred rivers, creeks, beaches, and wetland resources in the region. Each of these resources is listed with specific pollutants or other stresses, such as flood control diversions which contribute to the deterioration of the resources. A priority schedule has been established to assign a total maximum daily load (TMDL) for each pollutant listed in the region by the year 2012. (See Map 8 page 75 for impaired water bodies in the region.)

Beginning in 1999, California's Department of Health is monitoring all beaches with more than 50,000 annual visitors or with adjacent storm drains flowing throughout the summer. Closures or advisories are issued for beaches that fail to meet the state's standards for various sources of pollution. Among all California counties, San Diego reported the highest number of beach closings and advisories, followed by Los Angeles, Santa Barbara, Orange, and Ventura. The number of beach closures across the nation nearly doubled last year, but the jump is attributed mainly to more stringent pollution testing of recreational waters. The total closings and advisories by county in 2000 were 1,266 in Los Angeles, 881 in Orange, and 856 in Ventura. Urban runoff is the main source of coastal pollution across the nation, and the problem is particularly acute in Southern California.

Energy

Four regions supply California with natural gas. Three of them, the southwestern US, the Rocky Mountains, and Canada, supply 85 percent of all the natural gas consumed in the state. The remainder is produced in California. In 1997, approximately one-third of all the natural gas consumed in California was used to generate electricity. Residential use accounted for one-fourth of all gas consumption, with the balance consumed by the industrial, resource extraction, and commercial sectors.

Power plants in the California meet approximately 75 percent of the in-state electricity demand; hydroelectric power from the Pacific Northwest provides another 11 percent; and power plants in the southwestern US provide another 14 percent. A large number of public-owned utilities and a small number of privately owned utilities provide local electricity distribution service in the SCAG region. Southern California Edison provides approximately 70 percent of the total electricity demand in the SCAG region, covering all or nearly all of Orange, San Bernardino, and Ventura counties, and most of Los Angeles and Riverside counties. (See map 9 page 76 for the location of power plants in the region.)

METROPOLITAN WATER DISTRICT SERVICE AREAS



Map 7

IMPAIRED WATER BODIES



Map 8

POWER PLANTS



Map 9

Southern California's Divergent Growth Patterns and Future Prospects

Crisis or Crises?

essay

The new millennium has seen an unexpectedly bumpy ride for Southern California's 17 million energy consumers. In 1996, when California embraced electricity deregulation, consumers were promised lower rates and reliability. To put it mildly, things did not work out as planned. From the summer of 2000 onward, Californians have seen sharp rate hikes, blackouts, and utility bankruptcies. With a new


round of rolling blackouts occurring in Spring 2001, other periods of energy discontent loomed.

Scrambling, state policymakers in 2001 eschewed deregulation in favor of government intervention involving state power purchases and long-term contracts, a proposal to purchase the utilities' transmission systems, and the creation of a state power authority. Proponents claimed that these policies, which may cost upwards of \$20 billion, will ensure a reliable supply of reasonably-priced electricity to consumers. In May 2001, the state Public Utilities Commission (PUC) proposed rate hikes of up to 60 percent to encourage conservation and allow issuance of state revenue bonds for power purchases.

This essay examines the impact of the energy crisis upon Southern California, analyzes what went wrong, and suggests how to resolve matters and ensure the state's and region's energy future. In actuality, there are at least two distinct and interrelated energy crises—electricity and natural gas. Reminiscent of the 1970's energy crisis, there has been also the prospect of sharp price hikes at the gas pump.

As for electricity, customers of the region's two major investor-owned utilities—Southern California Edison (SCE)





serving over 11 million residents and San Diego Gas and Electric (SDG&E) serving 200,000 residents in southern Orange County and 2.8 million in San Diego County—have been on the front lines of California's botched experiment with deregulation. Beginning in May 2000, SDG&E's customers—the first in the state to have their rate freeze lifted—witnessed a doubling and even tripling of their electricity bills. Subsequently, state legislation capped SDG&E's retail rates. Yet, SDG&E continued to accrue debt by paying much higher prices than it collected from its customers for the electricity it purchased on the unregulated wholesale market. The shortfall went into a balancing account to be paid, presumably by ratepayers, when the cap would be lifted in 2002.

Southern California Edison's travails have been quite different. Edison's rates remained frozen because it had not fully paid off its stranded power plant investments. Thus, the generation component of its retail rate remained at 6.3 cents per kilowatt hour (kWh) while it paid up to 3 1/2 times as much—22 cents per kWh—on the unregulated wholesale market. As a result, Edison's debt ballooned to over \$5 billion and its stock price plunged, erasing \$4.5 billion in market value in a few months. Yet, Edison's customers, hit with a modest emergency rate increase authorized by the PUC, faced the continued threat of blackouts due to recurring Stage 3 Alerts, called when the state's energy reserves drop below 1.5 percent.

Generally spared these negative effects were the SCAG region's 4.8 million residents served by ten municipal utilities and one irrigation district. These included Anaheim, Azusa, Banning, Burbank, Colton, Glendale, Los Angeles, Pasadena, Riverside, Vernon, and the Imperial Irrigation District. Despite warnings that deregulation would be the death knell for California's municipal utilities, many of which like Los Angeles's Department of Water and Power had large debts and high rates, the municipals instead prospered by forsaking deregulation, which required that power plants be sold off in exchange for debt relief. By keeping their power plants, municipal utilities maintained control of their rates and costs. Ironically, just as the debts of California's private utilities soared, the municipals were able to reduce their debts by selling surplus power.

The electricity crisis also influenced natural gas supply and demand. Already deregulated, the natural gas market has seen wholesale prices more than double in the past year with no relief in sight. This poses a double shock to consumers. They are forced to pay higher gas bills while the electricity costs associated with natural gas power generation are driven up as well. Southern California is served by two large investor-owned natural gas utilities—Southern California Gas Company (SoCalGas) and SDG&E—and the City of Long Beach's municipal gas utility. These utilities have little control over wholesale prices since eighty-five percent of their supplies are imported from out of state.

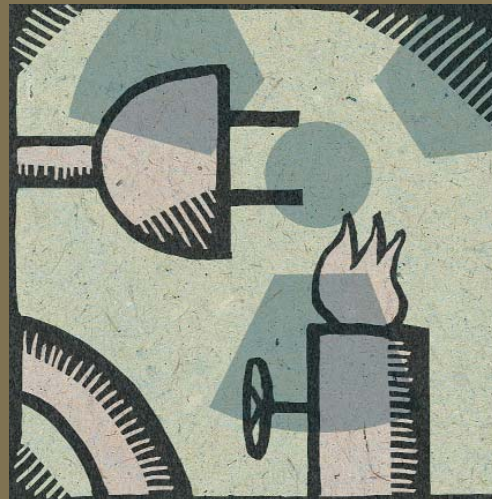
What Went Wrong?

In early 1998 California's new electricity market became operational. Yet, for the first two years wholesale prices remained low and the system operated reliably. However, since May 2000, California—and the entire West—have experienced record-breaking wholesale prices and unprecedented short-ages. What has caused these to occur?

The current energy crisis is fundamentally a product of increased demand for both electricity and natural gas and decreased supply. When the Public Utilities Commission first proposed deregulation in 1995, the state had an electricity surplus, and few, if any, forecast the rapid growth in electricity demand resulting from the state's economic recovery, fueled by the energy-intensive high-tech and computer sectors. In 2000, statewide demand grew by over seven percent, double the previous year, and well above the historic one-to-two percent annual growth rate.


Natural gas demand and prices also soared as reduced availability of low-cost hydropower from the Pacific Northwest forced reliance upon older, inefficient natural-

gas fired power plants. From June through November 2000, natural gas consumption in the West soared 62 percent. With the natural gas delivery system at capacity, prices soared, contributing to the higher cost of wholesale electricity. Even after the summer peak season ended, the wholesale prices of electricity and natural gas remained at record levels, exacerbated by scheduled and unscheduled maintenance of the state's power plants.



Aggravating these market imbalances were flaws in the state's restructuring scheme. The initial impetus for electricity deregulation, though, was national, not state. In the late 1970's, the nation's wholesale electricity market was first opened to competition. Responding to the OPEC energy crisis, Congress tried to reduce oil consumption by encouraging cogeneration and renewable elec-

tric power. Utilities were required to purchase renewable power under long-term contracts, and had to open their transmission lines to transport this power. In 1992, Congress further opened the wholesale market and transmission system to market forces. To stimulate competition, the new law required utilities to provide open access to their transmission systems. It also encouraged development of more energy efficient power generation technology. The



Federal Energy Regulatory Commission then removed price controls when it determined that a wholesale market was workably competitive.

As the national market was being deregulated, California's energy prices remained high. Burdened by high-cost nuclear facilities and expensive investments in renewable energy, the state's rates were 50 percent above the national average. As a result, large energy-using businesses demanded rate relief, and threatened to relocate to neighboring states with lower energy costs. Faced with this challenge, the PUC and state legislature, guided by the belief that competition would lower wholesale prices, grappled with regulatory reform to reflect the reality that electric generation was no longer a monopoly service.

Unfortunately, California's efforts to fix the electricity market have been a classic example of Murphy's law. Despite lengthy deliberations, the PUC in late 1995 adopted a radical and untested plan. It ordered the state's utilities to sell off their power plants because they couldn't be trusted to operate fairly without price regulation due to their sheer market power. Yet, there was no guarantee that other power generators would not manipulate the market in similar fashion.

The PUC also restructured the state's marketplace in ways that aggravated the ensuing crisis. In creating the state's Power Exchange, or wholesale auction, it forced utilities to

buy their supplies on the volatile daily spot market rather than under long-term contracts featuring firm price and delivery obligations. To provide non-discriminatory transmission access and guarantee supply reliability, the PUC created an Independent System Operation (ISO). When buyers from the Power Exchange underestimated their electricity needs, the resulting shortfall had to be filled by the ISO with last-minute direct purchases from generators and marketers. These unscheduled purchases resulted in expensive, last-minute panic buying. Generators quickly learned how to leverage this situation to their economic advantage.

In 1996, restructuring shifted from the PUC to the state legislature, where two new features were introduced. First, retail rates were frozen at current levels to protect consumers and encourage utilities to keep their stranded costs to a minimum. Second, state revenue bonds were issued to finance a ten percent rate decrease for residential customers while allowing the utilities to surcharge customer's bills to pay off their debt. When their stranded costs were paid off, the freeze on retail rates would be lifted.

The increase in electricity demand and reduction in supply that has gripped California and the West in the past year was an unexpected and serious problem. The crisis was aggravated by flaws in the state's restructuring plan.. Some of the proposed policy solutions in fact may make matters worse.

Resolving the Energy Crisis

California need not give up on its desire to create a competitive wholesale and retail market for electricity. The high prices and shortages facing the state are also being experienced in other Western states. To date, though, California has been the only state in the region to open its market. Given the success of deregulation in other U.S. markets, it is too simplistic to lay the blame for the current crisis solely upon deregulation. In the past year the combined effects of the loss of hydroelectric power from the Pacific Northwest, which faces a prolonged drought, and the reduction in imports from the desert Southwest, which experienced record summer temperatures, have sent California's market into chaos.

There is no quick fix to what's wrong with wholesale electricity and natural gas markets in California and the West. It will take time to fix what is broken, but here are ways of resolving the crisis:

>1 Raise retail rates: While natural gas retail rates have increased to reflect current costs, retail electric rates remain well below today's market realities. This creates two problems. First, consumers do not reduce their demand in response to high cost and commodity scarcity. Second, utilities and now the California Department of Water Resources are not reimbursed for the money spent

for wholesale purchases. They are exhausting the limits of their credit. As the PUC recognized when it belatedly approved a rate increase, consumers must pay the going rate for what they consume, however painful that may be.

>2 Invest in Energy Efficiency: The most powerful tool we have to dampen energy costs is to reduce demand. Financial incentives such as higher rates and the state's initiative to educate consumers are, in the short run, among the few policy tools we have.

>3 Build More In-State Power Plants: After ten years of inactivity, California is on the right track to accelerate the permitting and construction of new power generators. However, these plants take about 2-3 years to build. To encourage power plant development, the state's officials will need to tackle local NIMBY resistance.

>4 Expand Natural Gas Infrastructure: The rapid growth in the number of natural-gas fired power plants will exhaust the surplus capacity in our intrastate and interstate pipeline systems. California must work with the Federal Energy Regulatory Commission to accelerate the review and permitting of proposed expansion projects.

>5 Fix California's Electric Transmission

System: Bottlenecks in the transmission grid increase costs and reduce operating flexibility. We need to rapidly correct these problems and expand the system where necessary.

>6 Consider Temporarily Relaxing Air-Quality Rules and/or Expand Emissions Credits Programs

As important as stringent air-quality standards are for Southern California's quality of life, until we can bring new, cleaner generators online, we need maximum flexibility to operate existing, less efficient generators. This may require us to temporarily waive existing emissions credits and relax other restrictions to allow these generators to operate in the short run. Alternatively, we can expand air-quality credits programs, where utilities can facilitate power plant construction by purchasing the emissions credits created by large-scale transportation projects that reduce pollution.

In the future, California's public officials are going to have to do a much better job of monitoring energy supplies and demand throughout the entire West to prevent skyrocketing prices and the lights going out. They also need to create greater market certainty and stability so that private investments in vitally needed energy infrastructure are made. Only when there are ample energy supplies will prices decline, reliability increase, and the bumpy ride for the region's energy customers be over.

Nancy I. Day is a former utility executive and currently an energy advisor to the Assembly Speaker's office. Steven P. Erie is a UC San Diego Political Scientist and Director of UCSD's Urban Studies and Planning Program. Both serve on the Los Angeles County Economic Development Corporation's California Energy Strategy Team.